

MIKHAYLOV, N.V.; LIKHTGEYN, A.M.

Investigation of the complete rheological curves and a formula for
the calculation of the effective viscosity of structurized liquids
with a molecular-kinetic interpretation of the component terms.
Koll.shur.17 no.5:364-378 S-O '55. (MLRA 9:1)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut po stroitel'stvu,
Moskva. (Rheology)

21 KHT9 EYM, M.P.

ZAKANDIN, Viktor Il'ich; PEREL'MAN, Boris Borisovich; LIKHTGEYM, M.P., red.;
MASLOV, N.A., red. izd-va; IAGUTINA, I.M., tekhn. red.; TOKER, A.M.,
tekhn. red.

[Economic accountability for job superintendents and foremen;
practices of the Cherepovets Metallurgical Building Trust of the
Ministry of Metallurgical and Chemical Plant Construction of the
U.S.S.R.] Khoziaistvennyi raschet proizvoditel'ia rabot i mastera
na stroiuchastke; opyt raboty tresta Cherepovetsmetallurgstroi
Ministerstva stroitel'stva predpriatii metallurgicheskoi i
khimicheskoi promyshlennosti SSSR. Moskva, Gos. izd-vo lit-ry po
stroit. i arkhit., 1957. 59 p. (MIRA 11:5)

(Construction industry--Accounting)

LONDARENKO, O.M.; GOLOVINSKAYA, S.M. [Holovins'ka, S.M.]; SAVCHENKO,
N.M.; LIKHTIK, O.G. [Likhtyk, O.H.]; BARANSKAYA, S.F.
[Barans'ka, S.F.]; RACHINSKAYA, T.V. [Rachyns'ka, T.V.]

Proposals of efficiency promoters of the "Children's Clothing"
Factory No.4 in Kiev. Leh. prom. no.3:74-76 JI-S '65.
(MIRA 18:9)

LIKHTIN, R.M.

More attention to safety measures in communications enterprises.
Vest.sviazi 16 no.7:28-29 J1 '56. (MIRA 9:9)

1.Nachal'nik Stavropol'skoy mezhdugoredney telefonney stantsii i
gerodskoy telefonney stantsii.
(Telecommunication--Safety measures)

AUTHOR: Likhtin, R.M., Supervisor

SOV/111-58-12-23/38

TITLE: ~~How We Provide Telephone Facilities for the Population~~ (Kak my obsluzhivayem naseleniye telefonnoy svyaz'yu)

PERIODICAL: Vestnik svyazi, 1958, Nr 12, pp 22-24 (USSR)

ABSTRACT: In January 1955, the Stavropol' long-distance telephone exchange was combined with the automatic city telephone exchange to form one economic enterprise; consequently the connecting lines between both exchanges were increased. Old telephone apparatus are being replaced by new ones manufactured by the "VEF" plant. The new organization made a profit of 104.6 % according to the production plan during the first seven months of 1958, while the productivity of the employees is rated at about 104.1 %. It was possible to enlarge the telephone network with the aid of interested enterprises and to improve the telephone service for the population. Ten metal telephone booths were installed and long-distance telephones were installed at information offices such as at the RR station. In this way, the information of ice clerk serves at the same time as a telephone operator. These achievements were possible

Card 1/2

SOV/111-52-12-25/55

How We Provide Telephone Facilities for the Population

by proper training of employees, on-the-job training of female telephone operators and socialist competition among the various employee groups.
There are 4 photos.

ASSOCIATION: Stavropol'skaya gorodskaya i mezhdugorodnaya telefonnaya stantsiya (Stavropol' City and Long-Distance Telephone Exchange)

Card 2/2

ZIL'BERMAN, A.A.; LIKHTMAKHER, L.M.

Straightening of a blast furnace. Biul. TSIICHH no.10:31-34 '60.
(MIRA 15:4)

1. Yuzhdomnaremont.
(Blast furnaces--Maintenance and repair)

LIKHTMAKHER, L.M.

Treatment of a ferromanganese salamander in a blast furnace
hearth. Met. i gornorud. prom. no.3:72-73 My-Je '65.
(MIRA 18:11)

VZNUZDAYEV, N.A.; KAMPACHEVSKIY, L.O.; Primali uchastiye: LIKHTMAKHER,
S.N.; GRACHEV, A.V.; STEFIN, V.V.; DEMBO, A.T.; SHEREMET, B.V.

~~Hydrophysical~~ properties and water balance of forest soils in
the central Kamchatka Valley. Pochvovedeniye no.10:30-43 0 '61.
(MIRA 14:9)

1. Laboratoriya lesovedeniya AN SSSR.
(Kamchatka Valley—Forest soils)

LIKHTMAN, A.I.

A generalization of strictly regular rings. Sib. nat. zhur. 4
no.3:641-646 My-Je '63. (MIRA 16:6)
(Rings (Algebra))

LIKHTMAN, A.I.

Nilpotent approximable groups. Sib. mat. zhur. 6 no.4:862-866
Jl-Ag '65. (MIRA 18:10)

LIKHTMAN, A.I.

Group rings of p-groups. Izv. AN SSSR. Ser. mat. 27 no. 4:795-
800 J1-Ag '63. (MIRA 16:8)

(Rings (Algebra)) (Groups, Theory of)

LIKHTMAN, A.I.

Normal divisors of the multiplicative group of a body. Dokl.
AN SSSR 152 no.4:812-815 0 '63. (MIRA 16:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
Predstavleno akademikom P.S. Novikovym.

GUDIVOK, P.M. (Uzhgorod); DROBOTENKO, V.S. (Uzhgorod); LIKHTMAN, A.I.
(Uzhgorod)

Representations of finite groups over a ring of classes of
substitutions modulo m . Ukr. mat. zhur. 16 no.1:82-88 '64.
(MIRA 17:5)

LIKHTMAN, A.I.

Subgroups of the multiplicative group of a body. Dokl. AN SSSR 163
no.2:293-294 J1 1965. (MIRA 18:7)

1. Submitted March 10, 1965.

SOBOLEVA, V.M.; LIKHTMAN, A.Ye.

"Micrometallurgy" of alloys for semiconductor devices. TSvet.
met. 35 no.9:70-73 S '62. (MIRA 16:1)
(Semiconductors--Analysis)

LIKHTEMAN, F. Z.

26637 Kliniko-zkspertnye dannye o gipertonicheskoy bolezni. Trudy Fak. terapevt. kliniki (Ivan gos. med. IN-T) VYP 3, 1949, s 19-28

SO: LETOPIS' NO. 35, 1949

LIKHTMAN, F. Z

26638 Respiratoriaya nedostatochost pri zabolevaniyakh pochk. Trudy Fak.
terapevt. Kliniki (Ivan. Gos. Med. In-T.) VYP. 3, 1949, 5, 64-69

LIKHTMAN, F. Z. I KALEZOUA E I

26639 Osobennosti mocheobrazovaniya pri alimentarnoy distrofii. Trudy fak.
terapevt. kliniki (Ivan. gos. med. IN-T) VYP 3, 1949, s. 70-74

SO: LETOPIS' NO. 35, 1949

LIKHTMAN, L.D.

Vacuum extractor in controlling intra- and postnatal fetal death.
Kaz.med.zhur. no.3:88-89 My-Je '62. (MIRA 15:9)

1. Vtoraya gorodskaya bol'nitsa Kazani (zav. akushersko-ginekologicheskim otdeleniyem - L.D.Likhtman, glavnyy vrach - N.S.Utkina).
(OBSTETRICS--EQUIPMENT AND SUPPLIES) (FETUS, DEATH OF)

KAUFMAN, S.A.; KULIKOV, K.M.; LIKHTMAN, N.P.; KHAYKIN, N.Sh.

Some features of the kinetics of photoconductivity in specimens
of high-resistance n-germanium doped with gold. Fiz. tver. tela
7 no.3:837-840 Mr '65. (MIRA 18:4)

1. 49041-65 SWA(1)/BWT(2)/REC(3)/EWP(4)/EWP(5) PLS-13P(c) AT/JO/JG
 ACCESSION NR: AP5006891 S/0181/65/007/003/0837/0840

AUTHOR: Kaufman, S. A.; Kulikov, K. M.; Likhtman, N. F.; Khaykin, N. Sh.

TITLE: Some features of the kinetics of photoconductivity²¹ in high-resistance n-type germanium samples doped with gold

SOURCE: Fizika tverdogo tela, v. 7, no. 5, 1965, 837-840

TOPIC TAGS: photoconductivity, germanium, photoionization, electron recombination, photoconductivity relaxation

ABSTRACT: The purpose of the investigation was to determine the causes of the discrepancy between the results of L. Johnson (Phys. Rev. v. 117, 1191, 1960) and the results obtained by others for high-resistance n-type germanium doped with gold at temperatures above 100K. To this end, the authors investigated the kinetics of the photoconductivity in samples drawn from the melt by the Czochralski method and containing $\sim 10^{15} \text{ cm}^{-3}$ atoms of gold, compensated with antimony to such a degree that the 0.2 eV level of gold was partially filled with electrons. Light was used to produce ionization. The samples were investigated at temperatures 65--110K. In addition to the usual mechanism of electron recombination, relaxation of photo-

Card 1/2

L 49045-65

ACCESSION NR: AP5006891

conductivity was observed, dependent on the concentration of the free carriers, on the singly negatively charged gold atoms, with section $1.5 \times 10^{-17} \text{ cm}^2$. This process is related to the motion of free carriers in the direction of the contacts and appears when the drift lifetime is shorter than the non-equilibrium electron lifetime. The singularities in the kinetics of photoconductivity in the material are attributed tentatively to the space charge around the contact, localized at the deep level of gold, and causing violation of neutrality as the carriers are drawn out of the sample. It is suggested on the basis of the results that the strong temperature dependence of the time constant of the photoresponse, obtained by L. Johnson and H. Levinstein (at temperatures above 100K) is not a result of a temperature variation of the electron lifetime, and that it is probably due to the small drift time. "The authors are indebted to T. M. Lifshits and S. G. Kalashnikov for valuable discussions." Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 24Sep64

ENCL: 00

SUB CODE: EM, MM

NR REF SOV: 006

OTHER: 004

Cord 2/2 cc

18397
S/190/63/005/002/018/024
B101/B102

AUTHORS: Zuyev, Yu. S., Pravednikova, S. I., Likhtman, T. V.
TITLE: Stress dependence of rupture time in the cracking of rubbers in aggressive media
PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 2, 1963, 262-268

TEXT: The correlation between static fatigue and corrosion cracking was examined by determining the dependence of the lifetime τ_1 on the stress at 0.001-0.002 ozone concentration in natural and synthetic rubbers with and without filler or plasticizer. The tangent b of the angle of inclination of the straight line $\log \tau_1 = f(\log \sigma)$, was determined. The deformation was kept so low that its effect on the structure was negligible. Results: In natural rubber and CKB (SKB) rubber without filler b was ~ 0.35 ; in polar rubbers, such as CKH-26 (SKN-26) and natural CKH-40 (SKN-40) rubber, b increased to 1.45. Dilution of the rubber...

Card 1/2

S/190/63/005/002/G18/G24
B101/B102

Stress dependence of rupture ...

a filler inert to ozone resulted in an increase of b . This is due to changes in the stress distribution, chemical activity and intermolecular interactions. $b = b_0 \exp(-kv_1)$, where b_0 is the b of the non-filled rubber, and $v_1 = (v - v')/v$; v is the volume of the rubber, v' is the volume of the ingredient. A distinct parallelism was observed between ozone cracking and static fatigue. For both $\tau_1 = B\sigma^{-b}$. Thus, the corrosive breakdown of rubbers under stress is only a special case of static fatigue. There are 8 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy
" promyshlennosti (Scientific Research Institute of the
Rubber Industry)

SUBMITTED: September 7, 1961

Card 2/2

ABRAMOVA, N.B.; LIKHTMAN, T.V.; NEYFAKH, A.A.

Study of mechanisms of the intensification of respiration in
the embryonal development of fish. Zhur. evol. biokhim. i
fiziol. 1 no.3:227-233 My-Je '65. (MIRA 18:7)

1. Gruppya kosmicheskoy biologii i biofiziki razvitiya Instituta
morfologii zhivotnykh imeni Severtsova AN SSSR, Moskva.

ZUYEV, Yu.S.; PRAVEDNIKOVA, S.I.; LIKHTMAN, T.V.

Stress dependence of rupture time in the cracking of rubbers
in aggressive media. Vysokom.sped. 5 no.2:262-268 F '63.
(MIRA 16:2)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.
(Rubber—Testing) (Strength of materials)

SANZHAROVSKIY, A.T.; GRINYUTE, G.A.; LIKHTMAN, T.V.

Effect of the loading time and temperature on the strength of
three-dimensional polymers. Dokl. AN SSSR 157 no.5:1196-
1198 Ag '64. (MIRA 17:9)

1. Institut fizicheskoy khimii AN SSSR. Predstavleno akademikom
P.A. Rebinderom.

LIKHTMAN, V. I.

"Deformation of Single Crystals of Metals as Facilitated by Adsorption of Surface-Active Substances," P.A. Rebinder, V. I. Likhtman, and V. M. Maslennikov, Compt rend acad sci URSS, XXXII, pp 125-9(1941) (SEE: Inst. Insect/Fungi. in Ya. V. Samoylov)

SO: U-237/49,8 April 1949

LIKHTMAN, V. I.

"Effect of Glide-plane Orientation in Single Crystals of Tin on their Adsorption-promoted Deformation," V. I. Likhtman, P. A. Rebinder, Compt rend acad sci URSS XXXII, pp 130-1 (1941) (SEE: Inst. Insect/Fungi. in Ya. V. Samoylov)

SO: U-237/49, 8 April 1949

2

CA

The effect of the rate of deformation and the temperature on the magnitude of the adsorptive reduction in the strength of single crystals of tin and lead. V. I. Likhitsman, P. A. Rebinder, and L. P. Yanova. *Doklady Akad. Nauk S.S.S.R.* 86, 927-30 (1947); *Chem. Zvest.* (Russian Zone Ed.) 1948, 11, 471-2; cf. preceding abstract.—Cylindrical single crystals of very pure Sn and Pb were prepd. by the method of Kapitza. Sn crystals having an optimum orientation of the gliding planes were chosen. This was not so essential in the case of the Pb crystals. The drawing diagrams were obtained using an app. of the Polanyi type. By the use of special app. the rate at which the crystals were drawn was varied from 0.05 to 1000% per min. The crystals were drawn in air, in petroleum oil (nonpolar and very pure), and in the latter with the optimum addn. (about 0.2%) of the following surface-active substances: oleic acid, palmitic acid, and cetyl alc. Measurements were made at 20 and 100°. The max. adsorption effect for Sn at 20° was at a rate of 5% elongation per min. The effect disappeared at 0.05 and at 100% per min. At 100° the max. effect was observed at 240%

per min. The effect disappeared at 10-15 and at 1000% per min. Pb behaved similarly, although Pb shows no flow limit. In these expts. the effect of raising the temp. was similar to that of reducing the rate of drawing. The extent to which the adsorption effect facilitates the deformation (reduces resistance) can therefore be observed only within certain limiting rates of deformation. These limiting values are detd. by the temp. at which the drawing is done.
M. G. Moore

LIKHTMAN, V. I.

Jun 1947

USSR/Metals
Crystallography
Deformation

"Regularities in the Deformation of Metallic Monocrystals and the Presence of Surface-Active Materials," P. A. Rebinder, Academician; V. I. Likhtman, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVI, No 7

Concludes that effects of action of an adsorbent substance - reduction of limit of flow, and decrease of coefficient of hardening - show a general relationship to concentration of oleic acid. Illustrated with microphotographs and two graphs.

PA 60T71

LIKHTMAN, V. I.

FA 60T75

USSR/Metals
Crystallography
Zinc

Jul 1947

"New Phenomenon of the Elastic Interaction in Single Crystals of Zinc Subjected to Plastic Flow," V. I. Likhtman, P. A. Rebinder, Academician, Soc Dispersed Systems, Inst Phys Chem, Acad Sci USSR, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVII, No 1

Continues previous studies on elastic qualities of monocrystals and discusses question of whether an undeformed monocrystal can be considered as an ideal plastic body.

60T75

LIKHTMAN, V. I.

USSR/ Electricity
Discharges, Electric
Metals

Feb 1948

"Structural Variations in a Metal Acted Upon by a Condensed Electrical Discharge" G. I. Pokrovskiy, V. I. Likhtman, Inst Phys Chem, Acad Sci USSR, Mil Engin Red Banner Acad imeni V. V. Kuybyshev, 2½ pp

"Dok Akad Nauk SSSR, Nova Ser " Vol LIX, No 4

Gives details of preliminary experiments on various metals using highly condensed energy and shows very satisfactory results.

PA 43/43T14

PA 45/49T18

LIKHTMAN, V. I.

USSR/Chemistry - Colloids
Chemistry - Relaxation

Jan/Feb 49

"Measurement of Relaxation in Structurally Colloidal System," S. Ya. Veyler, V. I. Likhtman, P. A. Re-binder, Inst Physicochem, Acad Sci USSR, 3 pp

"Kolloid Zhur" Vol XI, No 1

Subject method for measuring period of relaxation is based on tangential mixing of plates in colloidal system under conditions of limited constant deformation. Shows lack of relationship between period of relaxation and amount of initial elastic deformation in construction of hydrozoi gelatin. Submitted 20 Mar 48.

45/49T18

PA 153T88

LIKHTMAN, V. I.

USSR/Physics - Crystallography
Crystals, Metallic

Nov 49

"Physicochemical Influences During the Deformation of Metallic Monocrystals," V. I. Likhtman, 31 pp

"Uspekhi Fiz Khim" Vol XXXIX, No 3

Schematic diagrams showing genesis of micro-schemisms and deformations. Mechanism of adsorptive "wedge-loosing" by single layer. Laws governing deformation of metallic monocrystal by surface-active substances. Dependence of adsorptive effect upon orientation of the base plane. Influence of concentration of oleic

153T88

USSR/Physics - Crystallography
(Contd)

Nov 49

acid in Vaseline upon tension curves. Influence of deformation and temperature upon adsorptive effect; deformation speed versus adsorptive decrease of strength. Influence of crystal dimensions upon tension curve and upon adsorptive effect of decrease of strength. In-elasticokinetic phenomena in monocrystals. Influence of surface-actives upon small deformations. Elastic aftereffects in deformed crystals.

153T88

CA

Effect of surface-active substances on small deformations of single crystals of tin. V. I. Likhtman and H. P. Zakoschchikova. *Doklady Akad. Nauk S.S.S.R.* 66, 657-660 (1949). -- Stress relaxation curves of Sn single crystals (wire 1 mm. diam., 2-3 cm. long), stressed by a dynamometric steel plate well below the yield point (initial stress $P_0 \sim 150$ g./sq. mm.), show the rate of plastic flow, in a 0.2% soln. of oleic acid in paraffin oil, to be about 3-5% greater than in air; the equil. state, characterized by the residual elastic stress of the dynamometer, P_{re} , is shifted to lower residual stresses. The increase of the cold-working coeff. λ (proportional to $P_{re}/(P_0 - P_{re})$) in consecutive deformation cycles is markedly slower in the surface-active medium. If, after 2-3 deformation cycles in air, the single crystal is immersed in the oleic acid soln., and deformation is continued in that medium, the flow curves, instead of rising with the no. of consecutive cycles, as they would in an inactive medium, fall, and, after 3-4 more cycles, pass below the curve corresponding to the 1st cycle. These phenomena are consistent with Rebinder's (H. et al., *ibid.* 66, No. 7, 8 (1947); 67, No. 1 (1947)) attribution of the pre-yield-point plastic flow, and permanent residual deformation, to exceptionally large "active" microcracks, and of the rule of the adsorbed surface-active substances, to a relief of stresses in such microcracks. In the presence of surface-active substances, relaxation of the elastic stresses in the crystal is more complete, and the residual stresses, not subject to relaxation, are smaller than in an inactive medium. N. Thou

ABSTRACT METALLURGICAL LITERATURE CLASSIFICATION

FROM SYNOPTIC

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200

2

Influence of the Size of Metallic Monocrystals on the Shape of the Elongation Diagram and on the Strength Decrease Caused by the "Adsorption Effect." (In Russian.) V. I. Likhnyan and E. K. Venstrein. Doklady Akademii Nauk SSSR (Reports of the Academy of Sciences of the USSR), new ser., v. 60, June 11, 1949, p. 891-893.

Refers to the effect of adsorption of surface-active agents. The above was investigated for monocrystalline tin wire from 0.4 to 2 mm. in diam. Method of investigation is described. Data are charted.

B

PROCESSES AND PROPERTIES INDEX

CONCERNING THE PROBLEM OF CRYSTALLIZATION OF METALLIC MELTS. (In Russian.) V. I. Likhman and B. M. Maslennikov. Doklady Akademii Nauk SSSR (Reports of the Academy of Sciences of the USSR), new ser., v. 67, July 1, 1949, p. 93-95.

Results of investigation indicate that, during crystallization of the metallic melt, the most important factor is "collective recrystallization" on the solid-liquid boundary. All of the methods for production of metallic monocrystals from melt or after plastic deformation have, as their basis, the process of "collective recrystallization" and are not affected either by heat transfer or by mold shapes.

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION

L. I. KHTMAN, V. I.

! *The Influence of Experimental Conditions on the Adsorption Effect in Facilitating Deformation of Metal Single Crystals. P. A. Rehbinder and V. I. Khtman (*Doklady Akad. Nauk S.S.S.R.*, 1949, 69, (3), 219-221; Russian). The importance of choosing the most suitable experimental conditions for work on the influence of surface active media on deformation processes is discussed. The negative results of Kemsley (*Nature*, 1949, 163, 404; *M.A.*, 17, 6) are explained by: (a) wrong etching of the single crystals, (b) unsuitable rate of extension (0.2-0.35%/min. instead of 5-10%/min.), and (c) failure to use non-polar grease in the control experiments. Maslennikov showed that the deformation of Sn single crystals with no surface prepn. exhibits strong dependence on the presence of surface-active media. The critical stress rises by approx. 100% in an atmosphere saturated with n-butyl alcohol vapour, whereas no hardening is observed if the test is carried out in vacuo. R. and L. have recently shown that the properties of surface-active media are well studied in respect of their effect on creep. This is explained by the fact that the microcracks cannot close. Venstrom showed that the creep rate of Sn single crystals immersed in a 0.2% soln. of oleic acid in kerosene is approx. twice that in pure kerosene. In the presence of a 0.3% soln. of oleylic acid in paraffin, the creep rate accelerates earlier than in oleic acid.—Z. S. B.

off

LIKHTMAN, V.I.

✓ A new method of growing metallic monocrystals from a melt. B. M. Maslennikov and V. I. Likhtman. *Akad. Nauk S.S.S.R., Trudy Inst. Fiz. Khim. No. 1, Novye Melody Fiz. Khim. Issledovan. Poverkhnost. Yaulenil* 145-9(1960).
A device is presented (drawings and photographs) for the prepn. of filiform monocrystals of Sn, Pb, Zn, Bi, and Al, which assures that heat is removed evenly throughout the melt as it crystallizes at any given moment and that the cooling proceeds slowly enough. Werner Jacobson

LIKHTMAN, V. I.

4 met

1. The Influence of Surface-Active Lubricants on the Processes of Pressing and Sintering of Powdered Metals. V. I. Likhtman and P. A. Rehbinder (*Doklady Akad. Nauk S.S.S.R.*, 1950, 76, (6), 851-853).—(In Russian). The influence of surface-active media on the processes of pressing and sintering of metal powders was studied. The surface-active medium employed was a soln. of oleic acid in either benzene or Vaseline grease, and the metal powders studied were Fe, Cu, and Sn. 5-10 mg. oleic acid in soln. to 1 g. of the metal powder ensured a monomolecular adsorbed layer. Powder treated with the benzene soln. had improved flow properties after evaporation of the benzene. The powders were pressed in cylinders of 12 mm. dia. The pressure necessary to obtain a given d was decreased by 10-20% by the presence of the adsorbed layer. This lowering is too great to be accounted for merely by the prevention of friction against the walls of the cylinder, and must be due to the facilitation of plastic deformation of the particles. The presence of surface-active media also influences the magnitude of the elastic expansion of compacts after pressing out of the cylinder. For Cu compressed at 20-40 kg./mm.², the elastic expansion was decreased 2-3 times, and for Sn made at 5-10 kg./mm.² it was decreased by 5-8 times. The presence of surface-active media increases resistance to corrosion. During sintering the surface-active medium is completely burnt away, but the physico-mech. properties of the product are better in comparison with those of the dry compacts prepared at the same pressure. Even at the same porosity, the quality of the compact made in the presence of surface-active media is somewhat better, as a result of the more even distribution of internal stresses introduced during pressing.

—Z. S. B.

CA

9

Sintering of metallic powders. V. I. Likhtman (Div. Disperse Systems, Inst. Phys. Chem., Acad. Sci. U.S.S.R.). *Doklady Akad. Nauk S.S.S.R.* 71, 323-5 (1959). -- Micrography of a powder of oxidized electrolytic Cu, pressed at 300° under graphite, shows tiny bridges of metal connecting grains where the metal was not brought into immediate contact by the compression. At 400°, the bridges are broader with recrystn. beginning to appear within the grains. The formation of the bridges is due to the particularly high mobility of the Cu atoms produced in the reduction of the oxide, at a temp. (300°) at which atoms of the metals itself do not possess appreciable mobility. The highly mobile atoms migrate preferably to points where the metal grains are closest to each other. Evapn. of metal which is possible, and was demonstrated, to take place, at highly active points at as low as 300-400°, and its condensation at less active points, may also play a role in the formation of the bridges. N. Thon

9

184T90

USSR/Metals - Powder Metallurgy

1 Jun 51

"Investigation of the Processes of Pressing and Sintering Metal Powders by the Electrical Conductivity Method," V. I. Likhtman, L. T. Nazarov, Inst Phys Chem, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol. LXXVIII, No 4, pp 749-752

Formation of contact surface in pressing and sintering powders of Fe, Cu, and Pb was studied in dry form and with active and inert lubricants. Method is based on assumption that contact zones are only means for flow of elec current from one particle to another and, consequently, elec cond of pressed

184T90

USSR/Metals - Powder Metallurgy (Contd) 1 Jun 51

Products is single-valued function of size and number of contact zones. Submitted by Acad P. A. Re-binder 9 Apr 51.

184T90

LIKHTMAN, V. I.

LIKHTMAN, V. I. ; MASLENNIKOV, B. M.

Crystallization

A new method for growing metal microcrystals from fusions. Trudy Inst.fiz.khimii
AN SSSR, No. 1, 1952.

Monthly List of Russian Accessions, Library of Congress, December 1952. Unclassified.

LIKHTMAN, V. I.

USSR/Metals-Powder Metallurgy

Apr 52

"Investigation of Pressing and Sintering Processes of Metallic Powders by the Method of Electric Conductivity," V.I. Likhtman, L.T. Nazarov

"Zhur Tekh Fiz" Vol XXII, No 4, pp 696-702

Subject method is advantageous for recording the contact surface in powder briquettes, which cannot be achieved by any other method; it clarifies processes of fritting and formation of contact surface and allows one to evaluate the solidity of contacts formed. Received 13 Apr 52.

216T59

L.IKHTEMAN, V. I.

PA 234T34

USSR/Chemistry - Metallurgy, Lubri- 21 Oct 52
cants

"Structural (Phase) Changes in the Metalloceramic Composition of Iron-Graphite During Sintering," V. I. Likhman, I. N. Smirnova, Inst of Phys Chem, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 86, No 6, pp 1151-1153

Heat treatment of the metalloceramic compn of iron-graphite consists of 3 basic processes.

First there is a qual and quant change in the contact surface, changing the system into one

234T34

consisting of agglomerated metallic grains. Then there is formation of nonuniform austenite. The 3d process consists of the breaking down of the austenite during cooling into some structure which is dependent on the concn of carbon and the cooling range. Graphitization proceeds extremely rapidly in porous metalloceramic iron-graphite compns, because it is not impeded by the diffusion of iron. Presented by Acad P. A. Rebinder 28 Aug 52.

234T34

LIKHTMAN, V.I., doktor fiziko-matematicheskikh nauk.

[Effect of surrounding conditions on the strength of metals] Vliianie sredy
na prochnost' metallov. Moskva, Izd-vo "Znanie," 1953. 39 p.

(MLRA 6:8)

(Metals)

LIKHTMAN, V.I.

Chemical Abst.
Vol. 48 No. 4
Feb. 25, 1954
General and Physical Chemistry

The influence of adsorption-active media on the mechanical properties of metals. V.I. Likhtman and P.A. Rebinder. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 17, 313-32 (1953).—The resistance of solids to stress and rupture is lowered by adsorbed surface-active layers which lower the surface tension and penetrate into microcracks preventing the interlocking at this spot. It was observed on Sn and Pb monocrystals treated with solns. of oleic and palmitic acid or cetyl alc. in heptane, kerosine, etc., that the limit of plastic flow is decreased according to $\Delta P_a = (P_a)_0 - (P_a)_a$ (a = adsorbed, o = nonadsorbed medium, P tension corresponding to the limit of plasticity). The max. of action is obtained for Sn and oleic acid at a concn. of 0.2%, corresponding to a satd. adsorption layer. At this concn. the thickness of segments of slip is a min. as well as the "coeff. of strengthening" $\lambda = dP_a/da$ ($P_a = P \sin x_0 \cos x$; $a = 1 + \epsilon (\sin x_0 - x)/\sin^2 x_0$; P = stress, x_0 initial lattice orientation, x = final lattice orientation, ϵ remaining deformation). Thermodynamics of surfaces show that mech. dispersion of solids in adsorption-active media leads

51

3

(2)

Strut

to a highly dispersed or colloidal fraction absent in a non-active medium. The plot of the adsorption effect *vs.* the speed of deformation at different temps. shows that at room temp. the lowering of the rupture stress of Pb by adsorption is important only in the range of 100-400%/min. with a max. at 200-250%/min. At 100° this max. is shifted to 800-900%/min. independently of the surface-active substance. For Sn the max. are 5%/min. at 20° and 500-600%/min. at 100°. Cycling the stress in a special app. produces relaxation effects, and it is shown that adsorption-active media change these relaxation effects completely. The phenomenon of creep as distinct from plastic flow is discussed and by a further analysis of the creep equation $P = P_0 + \lambda \epsilon + (\eta d\epsilon/dt) - \chi r$ (cf. Likhtman C.A. 45, 7493g) the creep is resolved into a stationary and a nonstationary component. Inactive hydrocarbon solvents have no action on the creep of Sn; polar compds. exercise an action, going through a max. of concn. The amt. of action is detd. by $[-COOH] > [-OH] > [-COOCH_3] > [-Cl]$. The concns. c_{max} decrease with the increase in mol. wt. in a homologous series (for propionic, caprylic, stearic acids $c_{max} = 0.640, 0.118, 0.007$ mol./l., resp.; for weak adsorbents Me laurate and lauryl chloride $c_{max} = 35\%$ and 48% , resp.). The nature of the solvent for the active substance is equally very important. The viscosity η and the strengthening coeff. λ of Sn are considerably decreased by surface-active adsorbents. Similar effects of smaller magnitude were observed on polycryst. Cu and Al wires. Adsorption also reduces resistance to fatigue. Electrocapillary tests of creep in solns. of 0.1N Na₂SO₄ (after reduction of oxide layers) show that the effect is localized on the surface and independent of any mineral films (cf. E. K. Venkstrom and P. A. Rebinder, C.A. 47, 5762c).
Serge Pakser

LIKHTMAN, V.I. (Moscow).

Physicochemical phenomena in the processes of compressing and sintering
powdered metals. Usp.khim. 22 no.7:878-889 J1 '53. (MLBA 6:7)
(Powder metallurgy)

LIKHTMAN, V. I.
USSR

539.4 : 548
/6056. Effect of oxide films on the mechanical
properties of ~~metals~~ metals. V. I. LIKHTMAN
AND V. S. OSTROVSKIY. Dokl. Akad. Nauk USSR, 23,
No. 1, 105-7 (1983) In Russian.

The yield point of a cadmium single crystal, having
a 500 Å thick surface film of oxide produced by
heating at 230°C for 7 hours, is ~14% higher than
that of an unoxidized sample, and the stress-strain
curves exhibit a sharp drop of shear stress in the
region of plastic deformation, an effect which increases
with reduction in wire diameter. These effects are
shown to be conditioned by the high strength of the
oxide in thin films (~300 kg/mm²). R. C. MURRAY.

MM
6000
R
CM

7 Substances lowering surface tension. Effect of absorption on mechanical properties of metals. *Metals* (Moscow) 1954, No. 10, p. 10. *Abstracts of Russian Literature* 1955, No. 9255. Adsorption of surface-active substances on the upper surface of a metal lowers the strength of atomic bonds in the surface layer; penetration of these substances into structural defects, which are often microcracks, facilitates their development in the deformation process. Alcohols, esters, acids, and their salts lower surface tension of metals. In a medium containing surface-active substances the yield point of metallic single crystals is 20-40% lower than in air, and the number of plastic displacements per unit of length in the sample is increased. The fatigue point of a metal operating in an active medium also is lowered. Strengthening the surface layer and creation of compression stresses in it reduce to a minimum the effect of surface-active substances. Their use facilitates drawing and stretching of metals by "plasticization" of the surface layer of the metal. *Marjorie Ketchum*

2/

LIKHTMAN, V. I.

USSR/ Miscellaneous - Materials

Card 1/1 : Pub. 124 - 8/35

Authors : Likhtman, V. I., Dr. of Phys-Math. Sc.

Title : Antifriction metal-ceramic material

Periodical : Vest. AN SSSR 7, 50-52, July 1954

Abstract : The process of manufacturing a new antifriction metal-ceramic (ferro-graphite) material as a suitable substitute for non-ferrous metals, is described. The special sintering and chilling methods, developed by the Institute of Physical Chemistry at the Acad. of Sc. USSR, which make it possible to manufacture antifriction metal-ceramic materials from powdered ferro-graphite without the possibility of formation of free cementite, which tend to destroy the antifriction properties of a material, are discussed.

Institution :

Submitted :

LIKHTMAN, V.I.; REBINDER, P.A.; KARPENKO, G.V.; YEGOROV, N.G., redaktor;
NEVRAYEVA, N.A., tekhnicheskii redaktor

[Effect of a surface-active medium on processes of metal deformation]
Vliianie poverkhnostno-aktivnoi sredy na protsessy deformatsii metal-
lov. Moskva, Izd-vo Akademii nauk SSSR, 1954. 206 p. (MIRA 8:4)
(Deformation (Mechanics)) (Metals)

USSR/ Chemistry - Metallurgy

Card 1/1 Pub. 118 - 4/6

Authors : Likhtman, V. I.

Title : Physico-chemical phenomena during deformation of metals

Periodical : Usp. fiz. nauk 54/4. 587-618, Dec 1954

Abstract : It was established that the surrounding medium has a definite effect on the mechanical properties of metals particularly during their deformation. These effects were observed not only in the form of chemical corrosion but also in the adsorption (also reversible) of the typical surface-active substances from the surrounding media which greatly facilitates deformation and destruction of the metal. This latter effect is sometimes found much more intensive than the effect of direct chemical conversion. Adsorption usually attacks all kinds of surface defects which are inherent of metals. These defects develop continuously during elastic and plastic deformations and in addition they result in the formation of new defects connected with plastic migrations over contact surfaces (sliding surfaces) in the deformed metal. Thirty-two references: 24 USSR; 3-German; 3-English and 2 USA (1928-1954). Tables; graphs.

Institution:

Submitted:

LIKHTMAN, V. I.
USSR/Physical Chemistry

Card 1/1

Authors : Ostrovskiy, V. S., and Likhtman, V. I.

Title : Effect of surface-active substances and oxide films on the process of deformation of cadmium monocrystals

Periodical : Dokl. AN SSSR, 96, Ed. 2. 319 - 321, May 1954

Abstract : Investigation of the effect of surface active substances on the deformation of cadmium monocrystals oxidized and completely or partially without oxide films was carried out in oleic acid solutions in iso-octane and n-butyl alcohol in water at optimum concentrations. Oxidation was achieved by heating the specimen in the air at 230° for a period of 2 hrs. The thickness of the oxide film was ~900 Å. Results are given in graphic form. Twelve references; 8 USSR. Graphs.

Institution : Academy of Sciences USSR, Institute of Physical Chemistry

Presented by : Academician P. A. Rebinder, February 20, 1954

L I K H T M A N, V. I.

The Laws of Pressing of Metallo-Ceramic Copper/Graphite Composites, T. M. Zaslavskaya and V. I. Likhman (Doklady Akad. Nauk S.S.S.R., 1954, 88, (3), 577-580). (In Russian). The behaviour and properties of mixtures contg. 5-25% graphite and 95-75% Cu were studied in relation to the pressure P of compacting. The relation $\ln \pi = \ln \pi_0 - kP$, where π and π_0 are the porosity of the mixture at the pressure P and 0, resp., and k a const. $= 1.34 \times 10^{-2}$ for all Cu/graphite mixtures studied, was obeyed in each case for pressures between 1500 and 4000 kg./cm.². The compressive strength of the specimens increased with P for any given compn. and was higher for mixtures in which the graphite particles were smaller than the Cu ones. The elect. resistance, R , of the mixture was measured at $P = 100$ kg./cm.² and was found to depend on the degree of oxidation of Cu. The occurrence of a max. on the R /graphite content curve for Cu powders contg. 0.3-0.8% O was explained by the initial increase of graphite/CuO contacts (increase of R) followed by the increase of graphite/graphite contacts (decrease of R) as the graphite content in the mixture increased. For the mixtures contg. 2-25% graphite the relation between R and P could be expressed by the equation $1/R = aP^b + b$, where a and b are const. which decrease with increasing graphite content. —S. K. L.

GORBUNOV, N.S.; LIKHTMAN, V.I., doktor fiziko-matematicheskikh nauk,
redaktor; YEGOROV, N.G., redaktor; NEVRAYEVA, N.A., tekhnicheskii
redaktor

[Vacuum method of thermal chromium plating] Vakuunnyi metod termo-
khromirovaniia. Moskva, Izd-vo Akademii nauk SSSR, 1955. 42 p.
[Microfilm] (MIRA 8:6)
(Chromium plating)

Likhtman, V.I.

✓ The laws of phase transitions during the sintering of copper-tin compositions. T. N. Znatokova and V. I. Likhtman. Doklady Akad. Nauk S.S.S.R. 103, 446-7 (1966). A new explanation of the sintering mechanism of the Cu-Sn system is presented, based on exptl. results. Cu diffuses into Sn at 200-235° with the formation of a new phase inside the Sn. No reverse diffusion of Sn into Cu is observed at that temp., whereas the direct process proceeds rather rapidly at the temp. near the m.p. of Sn. The intermediate layer is composed of 2 phases, the gray ϵ -Cu₃Sn (38% Sn) and the white η -Cu₃Sn (81% Sn). Large white aciform crystals of the η -phase penetrate into Sn and are distributed through most of it. The same process was observed at 200-235° with Cu plates coated electrolytically with Sn, and by heating a powd. mixt. of the 2 metals. At 300° the ϵ -phase becomes enlarged at the cost of the η -phase and Cu, and all the η -phase disappears at 400° with the formation of a new, higher-Cu δ -phase. At 500-600° the intermetallic compds. break down with the formation of a solid soln. At 600° a solid soln. is formed with the δ -phase, or a eutectoid of the α and δ phases. At 700° the mixt. becomes more homogeneous, δ disappears almost entirely, and finally at about 800° a uniform solid soln. is obtained. In a 10% solid soln. the liquid phase can form only when the liquidus line is reached (840°). W. M. Sternberg

① A
DM

LIKHTMAN, V.I., doktor fiziko-matematicheskikh nauk.

Physical chemistry and the strength of solid bodies. Vest.
AN SSSR 26 no.9:8:13 S '56. (MLRA 9:11)
(Chemistry, Physical and theoretical) (Solids)

Likhtman, V. I.

Electrocapillary effects of hardness reduction and the external metal friction. E. K. Venstrom, V. I. Likhtman, and P. A. Reblinder. Doklady Akad. Nauk S.S.S.R. 107-108-7(19/6).—New detus. were made by the pendulum method in 0.1N H₂SO₄ under conditions of surface deformation, with ground-glass fused upon the glass ball bearings, and in N KCl, under boundary-friction conditions and with no observable surface deformation (the ball bearing was a smooth glass ball). The capillary effects in the 2 cases were found to be inverted. 21 references.

W. M. Sternberg

SKM

Soviet. Phys. Chem. AS USSR

LIKHTMAN, V.I.

Category : USSR/Solid State Physics - Mechanical properties of crystals and poly- E-9
crystalline compounds

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1360

Author : Stupishina, O.V., Likhtman, V.I.
Inst : Inst. of Physical Chemistry, Academy of Sciences USSR
Title : On Brittle Softening of Cast Steel

Orig Pub : Dokl. AN SSSR, 1956, 107, No 2, 252, - 254

Abstract : An investigation was made of the mechanical tension characteristic on the degree of porosity of cast steel varying in hardness from 25 to 60 R_c . The most sensitive to the presence of micro-pores are the ultimate strength and the reduction at the neck. The yield point shows little dependence on the degree of porosity, and the proportional limit is practically independent of it. When the hardness of cast steel is increased, one observes a brittle softening of the steel, manifesting itself in a sharp decrease in strength when the hardness is increased above 38 -- 40 R_c . The authors attribute the appearance of brittle softening to the occurrence of strong overstresses near the pores. At lower steel temperatures these overstresses are reduced to a considerable extent by the plastic deformation.

Card : 1/1

LIKHTMAN, V.I.

CARD 1 / 2

PA - 1639

SUBJECT

USSR / PHYSICS

AUTHOR

CISTOTA, S.JA., VEJLER, V.D., LICHTMAN, V.I., REBINDER P.A.

TITLE

The Influence exercised by active Lubricants on the drawing of Metals.

PERIODICAL

Dokl.Akad.Nauk, 110, fasc. 4, 562 - 565 (1956)

Issued: 12 / 1956

Here the rules and the mechanism of the influence exercised by lubricants on the drawing of a steel wire are investigated. On this occasion a wire made of steel 0 with the diameter of 1,97 mm was reduced to the diameter of 1,82 mm by drawing. Drawing velocity was 12 cm/min; drawing stress was measured by means of a dynamometer. The influence exercised on drawing by liquid hydrocarbons, alcohols and acids was investigated at 20 and 60°. A diagram illustrates the modification of stress in dependence on the number of carbon atoms in the chain of the individual hydrocarbon. If the number of C-atoms in the molecule of the lubricant is increased, the stress caused by drawing diminishes. Hydrocarbons which are liquid at room temperature from hexane to zetane ($C_{16}H_{34}$) diminish stress by 9%. In from methyl to dexyl-alcohol, as well as from propion to pelargon acid at 20° stress is reduced by 23%. At 60° the effect of alcohols does not change, but the acids reduce stress by 40%. Mineral oils are little effective as lubricants especially at higher temperatures. The rather high efficaciousness of alcohols and acids at 20° can be explained by the rather firm absorption binding of these substances binding them to the metal surface. This entails also a plastification of the surface layer of the metal in the presence of surface-active substances.

Such a mechanism recommends itself by numerous favorable tests with respect to the

LIKHTMAN, V. I.

5903* (Russian) On the Mechanism of the Action of Lubri-
cants in Metal Frictionless mechanism detektiva smazok pri
otiraniye metallov devleniem 5. 1. 1. V. I. Likhtman
and P. A. Rebindey Doklady Akademii Nauk SSSR
Oct 21, 1955, 1955, 448, 449
Shows that in metal forming the lubricant has an active in-
fluence on surface deformation and the elastic phenomena
appearing after pressure relief and that lubrication improves
the quality of the surface under stress and

3

Not

9/11/55

7

Likhtman, V. I.

The adsorptional lowering of the strength of single crystals of metals and their spontaneous dispersion in the liquid phase. P. A. Rebiner, V. I. Likhtman and L. A. Kechina. Doklady Akad. Nauk S.S.S.R. 111, 1273-74 (1953). The lower strength of metallic systems caused by interfacial tensions is discussed, and the very high surfactant values of fused substances of similar chem. properties are pointed out, such as the effects of low-melting metals and alloys on metals, or fused glasses or salts on glasses and ionic crystals, in particular in the presence of the same cations. The elongation diagram at a uniform rate of 15%/min. of 99.99% Zn single crystals, uncoated or electrolytically coated with 1-5 μ of Sn are shown, and photographs of uncoated and coated Zn crystals, the former at 105% elongation, and showing the typical plastic rupture, the coated crystal with 9% elongation showing the brittle rupture. The tests were run at 400°. The effect is greatly magnified by a rise in temp., owing to a higher sol. of Zn in Sn. Similar results were obtained with the Pb-Sn system. The addition of surfactant metals results in the development of a finer crystal structure which may improve the mech. properties at room temp., but greatly lowers their heat resistance.

W. M. Sternberg

Dept. Dispenser Systems, Inst. Phys. Chem. 11/1/55R

LIKHTMAN, V. I.

126-3-18/34

AUTHORS: Znatokova, T. N. and Likhtman, V. I.

TITLE: Relations governing the pressing and the sintering of copper base cermet compositions. (Zakonomernosti pressovaniya i spekaniya metallokeramicheskikh kompozitsiy na mednoy osnove).

PERIODICAL: "Fizika Metallov i Metallovedeniye" (Physics of Metals and Metallurgy), 1957, Vol.4, No.3, pp. 511-518 (U.S.S.R.)

ABSTRACT: In cermet systems with interacting components the mechanism of formation of the structure in the process of sintering has characteristic features which are associated with the disperse nature of the starting powder materials. Study of this mechanism is essential from the point of view of controlling the properties of the manufactured components, improvement of their quality and elucidation of conditions observed in certain cases of changes in the properties during operation. Of the various cermet systems the system copper-tin-graphite has not been adequately studied, although it is of practical interest since it is widely used for brushes in electrical machinery and as an antifriction material. Existing conceptions on the mechanism of structural transformations in this system are contradictory as can be seen from the work of Hall, H.E. (1) and Wain, H.L. (2).

Card 1/4

126-3-18/34

126-3-18/34

Relations governing the pressing and the sintering of copper base cermet compositions. (Cont.)

produced by applying pressures of 3000 kg/cm^2 and sintering in the temperature range 100 to 850 C. Several micro-structure photos obtained from this material after various conditions of heat treatment are included. It is concluded that the process of sintering of copper-tin compositions can be sub-divided into the following four stages: melting of the tin and rapid cessation of the liquid phase as a result of formation of a η -phase; formation of an ϵ -phase at the boundary between the η -phase and the copper as a result of continuing diffusion; cessation of the ϵ -phase, occurrence and development of the δ -phase at the boundary between the ϵ -phase and the copper accompanied by enrichment of tin with the solid solution; decomposition of the δ -phase caused by the transfer of the entire tin into the solid solution and homogenization of the solid solution. In pressing copper-tin-graphite mixtures, graphite proved to have the same influence as it has in pressing copper-graphite mixtures, i.e. it increases appreciably the density and reduces the strength of the presslings, as can be seen from the numerical data given in Table 2, p.518; during sintering the influence of graphite consists in mechanical braking of

Card 3/4

126-3-18/34

Relations governing the pressing and the sintering of copper base cermet compositions. (Cont.)

the diffusion processes by screening the copper-tin contact surfaces. The general character of the transition from a mixture of individual particles to a uniform alloy during sintering in presence of graphite remains unchanged, since the graphite does not interact with copper or tin but the completion of the individual stages of sintering is shifted into the range of higher temperatures.

Card 4/4

There are 2 tables, 6 figures and 11 references, 4 of which are Slavic.

SUBMITTED: March 14, 1956, after revision May 5, 1956.

ASSOCIATION: Institute of Physical Chemistry. (Institut Fizicheskoy Khimii AN SSSR).

AVAILABLE: Library of Congress

LIKHTMAN, V.I.

AUTHOR: VEYLER, S.YA., LIKHTMAN, V.I. PA - 3564
 TITLE: Lubrication Action by Pressure Treatment of Metals. (Zakonomernosti
 deystviya smazok pri obrabotke metallov davleniyem, Russian)
 PERIODICAL: Zhurnal Tekhn.Fiz. 1957, Vol 27, Nr 5, pp 1087-1094 (U.S.S.R.)

ABSTRACT: In the case of high pressures the roughness of the surface is hardly of any importance, whereas the molecular cohesion of the cooperating metal surfaces plays a decisive part. The tangential displacement of these metals cannot immediately disrupt molecular connection, but a plastic flux is caused on the surface of the softer and more plastic metal, which penetrates to a considerable depth. Thus we are allowed to speak of friction or frictional forces only under certain conditions.
 Action upon the metal and elastic release in the presence of lubricants was investigated during calibration by means of a ball, during deep drawing and wire drawing. Experiments showed that processes during the action of lubricants on the occasion of different metal working processes are the same, but that in dependence on the character of the state of stress and the kind of deformation, these processes develop in different manners. In some cases the lubricants

Card 1/2

PA - 3564

Lubrication Action by Pressure Treatment of Metals.

prevent an additional consolidation of the surface layer of the metal treated, and in others they promote such consolidation. (With 1 Table, 7 Illustrations, and 9 Slavic References).

ASSOCIATION: Institute for Physical Chemistry, Moscow

PRESENTED BY:

SUBMITTED: 5.7.1956

AVAILABLE: Library of Congress

Card 2/2

20-114-6-24/54

AUTHORS: Veyler, S. Ya., Likhtman, V. I.

TITLE: Laws Governing the Drawing of Metals in the Presence of Lubricants (O zakonomernostyakh volocheniya metallov v prisutstvii smazok)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 6, pp. 1224-1227 (USSR)

ABSTRACT: Like all other processes of the working of metals under pressure the drawing of a metal does not only depend on the overcoming of the metal's resistance to deformation, but also on the overcoming of the friction forces which develop on the contact surface metal-instrument. At high pressures the friction mainly consists of the flow of the surface layer of the softer metal. The process of drawing consists of the volume deformation of the metal and of an additional shearing deformation of the metal to be worked, which latter is due to the seizing of the metal by the instrument. The first process, i.e. the drawing itself, is necessary and useful. But the second process is harmful, because it requires the complete utilization of the deformability of the metal and because it consumes much energy. The force necessary for the volume deformation of the

Card 1/3

20-114-6-24/54

Laws Governing the Drawing of Metals in the Presence of Lubricants

metal (without friction) alone can be represented as $F_1 = P_m S' \sin \alpha = P_m \Delta S$. The force necessary for the additional shearing deformation of the surface layer satisfies the equation $F_2 = \tau_1 S_k$. Thus the following applies to the force necessary for drawing: $F = F_2 + F_1 = \tau_1 S_k + P_m \Delta S$. P_m here signifies a certain mean stress to which the metal is exposed on passage through the opening, $\Delta s = S_0 - S$ - means the reduction of the cross section of the metal wire or the metal strip due to drawing, α - the cone angle, τ_1 - the maximum shearing stress or the resistance to cutting, S_k - the surface area of the contact between metal and instrument. A table contains the results on the drawing of copper and brass strips. The active lubricant influences only the first term of the above-given formula for F , the second term is almost independent of the presence or the quality of the lubricant. The here obtained results may also be applied to other processes of the working of metals under pressure. There are 2 figures, 3 tables, and 7 references, 6 of which are Slavic.

Card 2/3

Likhtman, V. I.

20-3-18/46

AUTHORS: Veyler, S. Ya. , Likhtman, V. I. , Rebinder, P. A., Academician

TITLE: Adsorption Plastification of a Surface Layer Under the Influence of Lubricants at the Pressure Working of Metals (Adsorbtsionnoye plastifitsirovaniye poverkhnostnogo sloya pod vliyaniyem smazok pri obrabotke metallov davleniyem)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 3, pp. 415 - 418 (USSR)

ABSTRACT: The authors illustrated the following: The essential part of the effect of liquid active lubricants at pressure working of metals is not the exterior friction but the resistance of the treated metals against the flow in a quite thin surface layer. This resistance determines the intensity of the tangential stress which occurs in the surface layer of the deformed metals. The liquid active lubricants reduce strongly the additional shearing deformation of the surface layer of the treated metal. The strong reduction of the "effective" friction coefficient (of the tangential stress) is caused by the localisation of the plastic friction in a thin layer of the softer covering metal. Stronger thinner coverages (nitration, carburization, chromium plating) impair upon the drawing process by intensification of the tangential stress. The shearing resistance τ_1 of the layer as computed by the measurements

Card 1/3

20-3-18/46

Adsorption Plastification of a Surface Layer Under the Influence of Lubricants
at the Pressure Working of Metals

of the authors does not depend on the properties of the principal metal. Inactive metals (oktane, vaseline-oil) lead to an increase of σ at an effected increase of the degree of deformation at drawing. The surface-active lubricants cause a decrease of σ_1 at an increase of the deformation degree. A diagram illustrates these changes for aluminum bands which are drawn out in active lubricants. These data show clearly that the effect of the surface-active liquid lubricants upon the adsorption plastification of a very thin surface layer of the treated metal is reduced. To estimate the thickness of the plastificated layers "model experiments" on the influence of thin coverage of a soft metal upon the stress of a wire which is drawn out were carried out. A diagram illustrates this influence on example of a wire which has been covered with copper before. The influence of the oxide film has to be brought into consideration on occasion of the investigation. To a large extent the adsorption plastification can explain the influence of the surface-active media at boundary friction. (Particularly at high temperatures). There are 3 figures, 1 tables, and 12 references, 11 of which are Slavic.

Card 2/3

20-3-18/46

Adsorption Plastification of a Surface Layer Under the Influence of Lubricants
at the Pressure Working of Metals

ASSOCIATION: Institute for Physical Chemistry of the AN USSR
(Institut fizicheskoy khimii Akademii nauk SSSR)

SUBMITTED: June 29, 1957

AVAILABLE: Library of Congress

Card 3/3

~~LIKHTMAN, V. I. and OSTROVSKIY, V. S.~~

"On the Rheology of Metals in Active and Surface-active Media."

report submitted Third Intl. Congress of Rheology, Bad Oeyngausen, GFR, 23-30 Sep 58.

Likhtman, V.I.

SOV/24-58-4-36/39

AUTHOR: Solomonov, M.

TITLE: Application of Technological Lubricants and Special Coatings During Shaping of Metals by Applying Pressure (Primeneniye tekhnologicheskikh smazok i spetsial'nykh pokrytiy pri obrabotke metallov davleniyem) Conference at the Institute for Mechanical Engineering of the Ac.Sc. USSR (Soveshchaniye v Institute mashinovedeniya Akademii nauk SSSR)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 4, p 153 (USSR)

ABSTRACT: The conference was held in December, 1957. The following papers were read: "General Relations and the Mechanism of Operation of Lubricants During Shaping of Metals by Applying Pressure" by V.I. Likhtman, S.Ya. Veyler (Institut fizicheskoy khimii AN SSSR - Institute of Physical Chemistry of the Ac.Sc.USSR); "Application of Principles of the Hydrodynamic Theory to the Process of Cold Stamping" by Ye.I. Isachenkov (NIAT); "New Stamping Lubricants for Deep and Particularly for Very Deep Drawing of Components made of Sheet Steel" by M.A. Sil'tsova (Gor'kovskiy avtozavod - Gor'kiy Automobile Works); "Lubricants for Stamping Sheet of Steel and of Various Alloys" by Yu.P. Davydov (VIAM);

Card1/4

SOV/24-58-4-36/39

Application of Technological Lubricants and Special Coatings
During Shaping of Metals by Applying Pressure
Conference at the Institute for Mechanical Engineering of the
Ac.Sc.USSR

"New Lubricants for Wire Drawing" by A.G. Smirnova
(TsNIICHERMET); "Investigation of Technological
Lubricants Applied for Hot Stamping of Metal Components"
by S.A. Dovnar (Minskiy politekhnicheskiy institut im.
I.V. Stalina - Minsk Polytechnical Institute imeni
I.V. Stalin); "Investigation and Testing of Certain
Technological Lubricants and Methods of Applying these
on the Dies of Presses During Hot Stamping of Aluminium
Alloys" by E.R. Shor (TsNIITMASH); "Lubricants Used in
Shaping of Metal by Pressure" by Ye.B. Zhuravskiy
(Aviatsionnyy zavod - Aviation Works). The data
given in the individual papers show the increasing use
of liquid, paste and solid technological lubricants
and special coatings in highly efficient processes of
shaping metals by applying pressure in the production
of complicated components from various heavy and light
non-ferrous alloys. The undertakings of the chemical
and the oil industries have so far not organised the

Card2/4

SOV/24-58-4-36/39

Application of Technological Lubricants and Special Coatings
During Shaping of Metals by Applying Pressure
Conference at the Institute for Mechanical Engineering of the
Ac.Sc.USSR

production of the appropriate lubricants and the instrument industry does not produce instruments for determining the main parameters of these lubricants. So far, investigations by individual institutes of the Ac.Sc.USSR on technological lubricants have not been carried out on a sufficiently large scale and have not been adequately co-ordinated. The same applies to other institutes.

S. Ya. Veyler (Institut fizicheskoy khimii AN SSSR - Institute of Physical Chemistry of the Ac.Sc.SSSR) reported on work in the field of lubricants for cold stamping. Since the result of this work is little known, it was proposed to devote to it a specially convened extended seminar at the Institute of Mechanical Engineering of the Ac.Sc.USSR.

Co-ordination was urged of the research work in the use of lubricants for shaping of metals by pressure and this

Card3/4

SOV/24-58-4-36/39

Application of Technological Lubricants and Special Coatings
During Shaping of Metals by Applying Pressure
Conference at the Institute for Mechanical Engineering of the
Ac.Sc.USSR

task should be undertaken by the Laboratoriya obrabotki
metallov davleniyem Instituta mashinovedeniya AN SSSR
(Laboratory for Shaping of Metals by Pressure of the
Institute of Mechanical Engineering of the Ac.Sc.USSR).
The importance was pointed out of putting onto the
market instruments for determining the main parameters
of lubricants and also of automatic equipment for coating
dies with technological lubricants. It is necessary to
work out standard specifications for technological
lubricants and also recipes and methods of analysis of
such lubricants and to increase the manufacture by the
industry of standard technological lubricants. At
regular intervals, symposia should be published on
technological lubricants and special coatings used in
the shaping of metals by applying pressure.

Card 4/4

AUTHORS: Ostrovskiy, V.S., Likhtman, V.I. SOV-69-20-5-17/23

TITLE: The Rheology of Metals in Surface-Active Media (K reologii metallov v poverkhnostno-aktivnykh sredakh)

PERIODICAL: Kolloidnyy zhurnal, 1958, Vol XX, Nr 5, pp 640-644 (USSR)

ABSTRACT: Plastic metals are similar to a viscous medium in many machining and deformation processes. The rheological laws of the creep of polycrystalline tin and lead under the conditions of homogeneous shear deformation are here investigated. The form of the tested specimens is given in Figure 1. The curves for the creep of tin are given in Figure 2. The speed of the established creep increases with the stress. Figure 3 shows the rheological curves for tin. At small stresses and at a temperature of 20°C, there is a section of linear dependence between the stress and the creep speed. If the temperature is increased, the transition from the linear part of the curve to the curvilinear, begins earlier. Figure 5 shows the dependence of stress and creep speed for high stress values and for temperatures of 20 and 86°C. At these temperatures, a sharp increase of speeds within small limits of stress changes is observed.

Card 1/2

The Rheology of Metals in Surface-Active Media

SOV-69-20-5-17/23

Surface-active substances considerably influence the creep curves. The values are higher than in air, with the stress remaining constant. The maximal effect is reached near the upper border of the field of constant plastic viscosity (Figure 7). There are 6 graphs, 2 tables, 1 diagram, and 4 Soviet references.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR, Otdel dispersnykh sistem, Moskva (Institute of Physical Chemistry of the USSR Academy of Sciences, Department of Dispersed Systems, Moscow)

SUBMITTED: June 16, 1958

1. Metals--Deformation 2. Metals--Temperature factors

Card 2/2

LIKHTMAN, V. I.; BARTENEV, G. M.; SHCHUKIN, Ye. D.; REBINDER, P. A.;

"Deformation processes, the rheological conduct and the destruction of solids and metals."

report presented at the Fourth All-Union Conference on Colloidal Chemistry,
Tbilisi, Georgian SSR, 12-16 May 1958 (Koll shur, 20,5, p.677-9, '58, Taubman, A.B)

AUTHORS: Veyler, S. Ya., Likhtman, V. I. SOV/57-28-9-25/33

TITLE: Action of Lubricants in the Pressure Working of Metals
(Deystviye smazok pri obrabotke metallov davleniyem)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1958, ^{Vol 28,} Nr 9, pp. 2025-2034 (USSR)

ABSTRACT: This is a study of the action of lubricants in the drawing of wire and of strip metal. The drawing process proceeds in two stages: 1) A deformation of the metal according to the required degree of deformation and 2) additional shearing deformations in the surface layer of the worked metal. This is caused by the clutching action of the drawing tool. The first stage, the actual drawing process, is desired and necessary, whereas the second process is detrimental. The design of a device is described which permits modelling.

Octane, octyl alcohol, oleinic acid, and paraffin were used as lubricants. The forces required in drawing are exactly proportional to the degree of deformation and are under the prevailing conditions practically independent of the lubricant. This was found with aluminum- and copper strips. Hence the force required for the deformation in freely rotating ^{rollers} is only dependent upon the properties of

Card 1/4

Action of Lubricants in the Pressure Working of Metals SOV/57-23-9-25/33

the metal (p_m) and upon the reduction of the cross-sectional area (Δs). The force required for the additional deformation is determined from the difference in the stationary (fixed) and in the freely rotating rolls: $\tau_1 s_k = F - p_m \Delta s$, where τ_1 denotes the maximum shear stress or shear resistance, s_k the area of the contact surface between the metal and the tool, and F the force. The force required for drawing $F = F_1 + F_2 = \tau_1 s_k + p_m \Delta s$; Formula (4). When liquid lubricants are used, the predominant feature is not the viscosity but the capability of the metal to become "plastified" in the thinnest surface layers. Numerous examples show that small admixtures of surface-active layers (0,2 ÷ 0,3%) to the water and oil media considerably increase the effectiveness of these media although their viscosity is not influenced at all. The resistance of the metal to deformation exhibited by the thinnest layers of the boundary, being the essential feature as compared to external friction, determines the magnitude of the shear stresses in the surface layer. Inactive fluid media (octane, vaseline oil) lead to an increase of τ_1 when the degree of deformation

Card 2/4

Action of Lubricants in the Pressure Working of Metals SOV/57-28-9-25/33

in the drawing of metal strips is increased. Surface-active lubricants, however, reduce τ_1 when the degree of deformation is increased. Inactive solid lubricants (paraffin) lead to the greatest reduction of τ_1 on soft metals, because the shear is localized in the thin coating outside the metal. If, however, harder metals (steel) are drawn the external layers of the lubricant coating are broken down. Thus the surface-active fluid lubricants are most effective in this case. The experiments showed that in the investigation of the "plastification" the influence of the oxide films must be taken into account and that with tin and lead they reduce τ_1 . Conclusions: The absorption plastification of surface layers in the presence of active lubricants and the localization of plastic deformations in the thin surface layers explain the mechanism of the action of lubricants in the pressure working of metals. There are 13 figures, 4 tables, and 8 references, 7 of which are Soviet.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR, Moskva (Institute of
Card 3/4 Physical Chemistry, AS USSR, Moscow)

AUTHORS: Likhtman, V. I., Shchukin, Ye. D. SOV/53-66-2-4/9

TITLE: Physico-Chemical Phenomena in the Deformation of Metals
(Fiziko-khimicheskiye yavleniya pri deformatsii metallov)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol 66, Nr 2, pp 213- 245
(USSR)

ABSTRACT: In the course of the past 10 years a new field of science was opened up by an association of Soviet scientists headed by P. A. Rebinder: the so-called physico-chemical mechanics, which is a field bordering upon those of physical chemistry, molecular physics, and the mechanics of materials. The main aims of this new field of science are: 1) Explanation of the laws and the mechanism of the production of solids of given structure and mechanical properties, and 2) the investigation of processes of deformation, of the working up and of the destruction of solids in consideration of the influence exercised by physico-chemical factors, the composition and structure of the body, of temperature and of the surrounding medium. Extensive experimental material is now available in this field upon the basis of which it is possible to develop a theory of the processes of production

Card 1/2

SOV/53-66-2-4/9

Physico-Chemical Phenomena in the Deformation of Metals

and destruction of solid materials as well as of the conditions for the best method of processing. Theoretical work is based upon the dislocation theory. The authors of the present paper give an extensive and, in parts, detailed survey of the principal results obtained by investigations carried out in this field during recent years; results obtained are discussed on the basis of numerous references to publications. The results of the physico-chemical mechanics of metals are also subjected to theoretical treatment (dislocation theory). The most frequently used materials for investigations were zinc and zinc monocrystals. There are 26 figures, 4 tables, and 69 references, 29 of which are Soviet.

Card 2/2

AUTHORS: Likhtman, V. I., Ostrovskiy, V. S. 20-119-3-23/65

TITLE: The Rules Governing the Plastic Flow of Lead and Tin Under the Conditions of a Clean Shear (Zakonomernosti plasticheskogo techeniya svintsa i olova v usloviyakh chistogo sdviga)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 3, pp. 484-487 (USSR)

ABSTRACT: First the authors give a short report on the state of the problem and on previous works, dealing with the same subject. This work studies the rheological properties of tin and lead under the conditions of a simple state of tension, which forms on occasion of the deformation by clean shear. The device, used by the authors, resembles the one of E. N. Andrade and K. H. Jolliffe (ref. 4). The samples, tested by this device, were disks, which were fixed at their periphery and in the center. The stress, which considerably remained below the flow limit, was caused by a rotation of the central part of the disk against its peripheral part. Into the disk-shaped test piece a concentric groove was cut, in which under stress a deformation with clean shear develops. After their mechanical working the test pieces were also annealed in an inert

Card 1/3

The Rules Governing the Plastic Flow of Lead and Tin Under the Conditions of a Clean Shear 20-119-3-23/65

atmosphere, so that the mean size of the grain is not be below a certain limiting value. A diagram illustrates the dependence of the velocity v_m of stationary flowing on the applied stress P for lead and tin. The initial domains of this curves are rectilinear. I.e. in a certain, relatively narrow interval with low tensions v_m is directly proportional to the applied stress P . On this occasion a noticeable flow of tin or lead starts only after having reached a certain flow limit. This flow limit in the here discussed experiments is at $t = 20^\circ\text{C}$ for lead $P_0 = 95 \text{ g.mm}^{-2}$ and for tin $P_0 = 87 \text{ g.mm}^{-2}$. In a certain interval of tension, which neighbours the flow limit, the expression $P = P_0 + \eta_0 v_m$ holds, whereby the viscosity η_0 is a constant quantity. The effective viscosity of the here examined metals decreases continuously in case of an increase of the applied stress and therefore cannot serve as a physical parameter, which characterizes a given metal. The plastic viscosity of the metal, characterized after Shvedov by the relationship $P - P_0 = \eta_0 v_m$, remains constant in a certain stress interval, which follows the flow limit P_0 ; there it does not depend on the applied shear stress and then decreases in case of further increase of the stress.

Card 2/3

The Rules Governing the Plastic Flow of Lead and Tin Under the Conditions of a Clean Shear 20-119-3-23/65

This highest constant value of the plastic viscosity is suited as a physical characteristic of the metal. A further diagram illustrates the adsorption-conditioned alleviation of the plastic flow of lead and tin as a function of the applied shear stress. The maximum effect in lead and also in tin is observed at those stresses, which correspond to the superior limit of the domain of constant viscosity. Finally the authors express their gratitude to the Member of the Academy P. A. Rebinder for valuable directions in the discussion of the results, which were found here. There are 4 figures and 7 references, 5 of which are Soviet.

PRESENTED: October 10, 1957, by P. A. Rebinder, Member, Academy of Sciences, USSR

SUBMITTED: September 25, 1957

AVAILABLE: Library of Congress

Card 3/3

SOV/20-120-4-19/67

AUTHORS:

Likhtman, V. I., Kochanova, L. A., Bryukhanova, L. S.

TITLE:

The Brittle Destruction of Single Zinc Crystals (O khrupkom razrushenii monokristallov tsinka)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 4, pp.757-760 (USSR)

ABSTRACT:

The single-crystal samples were produced from pure zinc (99,99 %) by the method of zone-crystallization which had been developed in the authors' laboratory. The rules governing the brittle destruction of single zinc crystals with different initial orientations of the basic plane with respect to the axis of the wire ($15^\circ \leq \chi_0 \leq 80^\circ$) were investigated by means of uniaxial rotation with constant velocity of the extension ($\sim 12 \% \text{ min}^{-1}$) of the samples in inactive and surface-active media. A diagram shows the results of the experiments carried out with single zinc crystals at the temperature of liquid nitrogen. The plastic displacement preceding the destruction is all the greater the smaller χ_0 . Besides, the normal tensions necessary for the break in the

Card 1/3

SOV/20-120-4-19/67

The Brittle Destruction of Single Zinc Crystals

basal plane decrease considerably with increasing χ_0 . The brittle breaking off on the basal plane is facilitated by a previous displacement in this plane. At relatively high normal tensions in the basal plane a slight displacement will already be sufficient to cause elastic breaking off. The experimental data obtained gave the following results: The so-called Zonke Law of the constancy of vertical normal tensions does not apply to single zinc crystals in a brittle state. Plastic displacement causes defects in crystal structure which prove to be the original cause of destruction. No "consolidation when breaking off" was observed in the case of single zinc crystals. The rules governing the brittle destruction in single zinc crystals at low temperatures apply also if transition to the brittle state occurs under the influence of a strong surface-active medium (e.g. mercury). A brittle state of a single zinc crystal that is caused by mercury satisfies the same general regular rules as the viscosity due to low temperatures. There are 4 figures, 1 table, and 15 references, 8 of which are Soviet.

Card 2/3

The Brittle Destruction of Single Zinc Crystals

SOV/20-120-4-19/67

ASSOCIATION; Institut fizicheskoy khimii Akademii nauk SSSR
(Institute of Physical Chemistry AS USSR)

PRESENTED; January 31, 1958, by P.A. Rebinder, Academician

SUBMITTED; January 22, 1958

1. Single crystals--Mechanical properties 2. Single crystals--Test
methods 3. Zinc--Crystallization 4. Zinc--Fracture

Card 3/5

24(2)

AUTHORS:

Labzin, V. A., Likhtman, V. I.

SOV/20-121-3-13/47

TITLE:

The Creep of Single Crystals of Zinc in Easily Fusible
Metallic Melts (Polzuchest' monokristallov tsinka v legko-
plavkikh metallicheskikh rasplavakh)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 3,
pp 443 - 445 (USSR)

ABSTRACT:

According to the results of previous papers, creep velocity is noticeably increased by the absorption of molecules with lower surface tension which are contained in the surrounding medium. Therefore it is interesting to investigate the creep of metallic monocrystals in media with a much lower surface tension (for example, in easily melting metals). Tin and lead, and also alloys of these metals (mixed in various relations) were used as media with lower surface tension. The zinc monocrystals were electrolytically coated by the easily melting metal. The creep of the monocrystalline zinc wires (with and without metallic coating, with lower surface tension) was

Card 1/2

The Creep of Single Crystals of Zinc in Easily Fusible
Metallic Melts SOV/20-121-3-13/47

investigated within the temperature range between room temperature and 350-400°. At low temperatures (up to melting of the surface coatings), the surface coatings noticeably reduce the velocity of the steady creep. In the presence of a tin coating, a noticeable increase by 15 times its amount of the velocity of the steady creep of zinc monocrystals begins at 250°. The coating of zinc monocrystals by thin lead films reduces the velocity of the steady creep at any temperature. The above mentioned and also other results of this paper agree fully with results of previous papers. There are 2 figures, 2 tables, and 6 references, 6 of which are Soviet.

ASSOCIATION: Saratovskiy pedagogicheskiy institut (Saratov Pedagogic Institute) Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, AS USSR)

PRESENTED: March 31, by P.A.Rebinder, Academician

SUBMITTED: March 5, 1958

Card 2/2

KARPENKO, Georgiy Vladimirovich, prof., doktor tekhn.nauk; LIKHTMAN,
V.I., prof., doktor fiz.-mat.nauk, retsenzent; FURER, P.Ya.,
red.izd-va

[Effect of machining on the strength and resistance of steel]
Vliianie mekhanicheskoi obrabotki na prochnost' i vynoslivost'
stali. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry,
1959. 184 p. (MIRA 12:6)

(Steel--Testing)

L. K. H. I. M. A. N., U. I.

15(6)

ABSTRACT:

TEXT:

PERIODICAL:

ABSTRACT:

Rebinder, P. A., Academician

007/30-39-1-3/57

New Trends of Colloid Chemistry (Noveye puti razvitiya kolloidnoy khimii)

Vestnik Akademii nauk SSSR, 1959, No 1, pp 44-51 (USSR)

At present, colloid chemistry plays an especially important part in political economy as it is a physical-chemical science concerning the processes of modern engineering. It is of great practical importance that at present it is possible to carry out fundamental researches from lyophobic to lyophilic systems. Thus, it is possible to obtain technically important substances with the required structural-sound properties. The theory of highly molecular substances and their solutions has developed into an independent branch of colloid chemistry. The vitality of modern colloid chemistry is proved by the fact that it produces many new independent branches of science. Further, the author dwells on the course of the 4th All-Union Conference of Colloid Chemistry which took place in Tbilisi on May 13-16, 1956. It was organized by the Odolnizye khimicheskoye.

P. A. Rebinder (Tbilisi) reported on the present state of research in the field of colloid metals. A. P. Shalagin (Minsk) determined theoretically and experimentally the mechanism of synthesis in foams. E. F. Volkovich with collaborators spoke about the results of studies of water properties and structure of peat by means of radioactive isotopes.

E. Ye. Mikhlinshvili considered questions of adsorption and desorption of electrolytes in colloid dispersions. E. V. Deryagin and his collaborators reported on the development of the electrostatic stability theory as well as the coagulation of dispersion systems. A. A. Krasovskiy reported on the properties of colloids. E. Ye. Kremmer, A. B. Zakharenko and A. B. Zakharenko reported on the role of the structural-mechanical factor in the coagulation of practical systems for a stable stabilization of dispersion systems (Ref 1).

Card 3/6

P. A. Rebinder actually showed that an increased viscosity of the medium leads to a decrease in the rate of coagulation of particles.

E. M. Dubinin and his pupils dedicated a series of reports to investigations in the field of structural characteristics.

A. E. Frankin with collaborators examined new appearances of adsorption in the theory of electrode processes.

E. A. Degutkin, A. Ya. Korshak discussed questions of adsorption of active fillers with polymers, as well as the chemical modification of the surface of solid particles (acet).

N. Ye. Belova, P. A. Rebinder and collaborators reported on the structure of the process of formation of crystalline structures in the hardening of mineral binding agents. E. M. Dubinin showed that the appearance of high elasticity is connected with the formation of dispersion structure. L. S. Palatnik (Dnepropetrovsk) examined the colloidal state of alloys in thin films and massive samples.

E. B. Zhukovskiy, V. F. Yudin clarified the theoretical criteria of spontaneous dispersion of solid bodies, especially metals, in surface-active surroundings.

V. I. Kithman reported on the appearance of adsorptive phenomena in the hardening of mineral binding agents.

E. A. Krasovskiy and collaborators examined the influence of rheological properties of printing colors on their behavior in the printing process.

V. M. Vladimirov reported on the regulation of crystallization and coagulation structures in the production of best table butter.

Card 4/6